



#7

CLAIMS

What is claimed is:

- Sub C6
1. A method of storing and communicating sets of topographic information to and from information processing and viewing devices by means of an accessible electronic network, each of the sets being specific to an individual golf course, comprising the steps of:
- (a) inputting a first set of information to a first information processing and viewing device, said first set of information being data representative of a golf course topography, said first set of information including data elements relating to attributes of the golf course, said data elements including at least one characterizing aspect and at least one location for each feature in the set;
 - (b) transmitting said first set of information from the first information processing and viewing device to the network; and
 - (c) providing a second information processing and viewing device access to said first set of information.
2. The method of claim 1 wherein said network is the Internet.
3. The method of claim 1 wherein at least one of said first and second information processing and viewing devices is a portable hand-held personal computer.

- Sub C7
6. The method of claim 1 including the additional steps of:
- (d) altering the set of information accessed from the network with said second device to produce a second set of information representative of the golf course topography;
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- (e) transmitting said second set of information to the network; and
- (f) providing access to said altered set of information.

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7. The method of claim 6 wherein the altering of the first set of information increases the accuracy of the data correspondence to the golf course attributes to produce a second set of information which is more correctly representative of the golf course than the first set.

Sub C8
8. The method of claim 1 wherein said data elements include Global Positioning System data of varying degrees of accuracy, said degree of accuracy of the Global Positioning System data in said location data elements being indicated by varying depictions of the attributes in the viewing devices, said varying depictions corresponding to their respective Global Positioning System data degrees of accuracy.

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9. The method of claim 1 wherein said data elements include Global Positioning System data with varying degrees of accuracy, and said altering of the first set data includes the utilization of differential Global Positioning System data to increase at least one of the first set location data elements degree of accuracy.

10. The method of claim 1 including the additional steps of:

- (d) storing said first set of information in a publicly accessible database, said database further storing additional sets of information representative of a plurality of golf courses; and
- (e) providing access over said network to the stored sets of information in the database.

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11. The method of claim 10 wherein the stored sets of information accessed from the database are alterable following accessing.

12. The method of claim 10 wherein said database is accessible by Internet connection to a web site, said web site providing the information sets in a form accessible with a web browser.

13. A system of storing and communicating sets of topographic information to and from information processing and viewing devices by means of an accessible network, each of the sets being specific to an individual golf course, comprising:

(a) a first information processing and viewing device receiving input of a first set of information, said first set of information being data representative of a golf course topography, said first set of information including data elements relating to attributes of the golf course, said data elements including at least one characterizing aspect and a location for each attribute in the set;

(b) a central information processing site and database receiving said set of information from said first information processing and viewing device and providing access to said set over the network; and

(c) a second information processing and viewing device receiving transmission of said first set of information from the first information processing device over the network.

14. The system of claim 13 wherein said network is the Internet.

~~15. The system of claim 13 wherein at least one of said first and second information processing and viewing devices is a portable hand-held personal computer.~~

Sub C9
18. The system of claim 13 including:

(d) altering with said second device the set of information accessed from the public network to produce a second set of information representative of the golf course topography; and
(e) transmitting said second set of information over the publicly accessible network to the central information processing site and database, said central site then selectively providing access to said altered set of information over the publicly accessible network.

19. The system of claim 18 wherein the altering of the first set of information increases the accuracy of the data correspondence to the golf course attributes to produce a second set of information which is more correctly representative of the golf course than the first set.

20. The system of claim 13 wherein said data elements include Global Positioning System data of varying degrees of accuracy, said degree of accuracy of the Global Positioning System data in said location data elements being indicated by varying depictions of the attributes in the viewing devices, said varying depictions corresponding to their respective Global Positioning System data degrees of accuracy.

21. The system of claim 20 wherein said data elements include differentially corrected Global Positioning System data with varying degrees of accuracy, and said altering of the first

set data includes the utilization of differential Global Positioning System data to increase at least one of the first set location data elements degree of accuracy.

22. The system of claim 13 wherein said central site and database further contain additional sets of information representative of a plurality of golf courses; and provides access over said network to the additional sets of golf courses information in the database.

23. The system of claim 22 wherein the stored sets of information accessed from the database are alterable following accessing.

24. The system of claim 22 wherein said database is accessible by Internet connection to a web site, said web site providing the information sets in a form accessible with a web browser.

25. A portable information processing and viewing device for storing and communicating topographic information comprising:

a portable information processing and viewing device, said device having an information processor for the storage, retrieval and processing of data which encodes information, said device also having a viewer for the display of information encoded in the data, said device further having data inputs, said data inputs including at least one of a user interface and direct electrical connections;

said information, encoded in the data, including information relating to at least one topographic characteristic of at least one selected geographic region, said geographic regions including those having at least a portion of a golf course, said characteristic being represented on

~~said viewer by visual signifiers, said visual signifiers including at least a representation of an attribute and an indication of a position of said topographic characteristic; and~~

~~said direct electrical connections adapted for connection with at least one cooperative device for enabling said information processing and viewing device to perform an operation of at least one of generating, accessing, storing and communicating of said data, wherein said cooperative device further enables said information processing and viewing device to autonomously process and display said information relating to topographic characteristics.~~

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28. ~~The information processing and viewing device according to claim 25 wherein said cooperative device is a position module for enabling said information processing and viewing device to store at least a first user generated data set that encodes information relating to topographic characteristics of at least a first selected geographic region.~~

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29. ~~The information processing and viewing device according to claim 26 wherein said user generated data set that encodes information relating to topographic characteristics is generated with said user interface.~~

30. ~~The information processing and viewing device according to claim 29, wherein said geographic region includes a golf course.~~

31. ~~The information processing and viewing device according to claim 25 wherein said cooperative device is a position module for enabling said information processing and viewing~~

device to modify at least a first data set that encodes information relating to topographic characteristics of at least a first selected geographic region.

32. The information processing and viewing device according to claim 31, wherein said geographic region includes a golf course.

33. The information processing and viewing device according to claim 25 wherein said cooperative device is a position module which enables the information processing and viewing device to store at least a first user interface entered data set that encodes information relating to topographic characteristics of at least a first selected geographic region; and

wherein said position module and said stored first user interface entered data set is transferable to a second information processing and viewing device for enabling said second information processing and viewing device to access said first user interface entered data set.

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34. The information processing and viewing device according to claim 25 wherein said cooperative device is a data link.

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35. The information processing and viewing device according to claim 34 wherein said data link is a connection to a personal computer for the communication of data between said information processing and viewing device and said computer.

34 36. The information processing and viewing device according to claim 32 wherein said data link is a connection to a network for the communication of data between said information processing and viewing device and said network.

35 37. The information processing and viewing device according to claim 34 wherein said network is a private access network.

36 38. The information processing and viewing device according to claim 34 wherein said network is a publicly accessible network such as the Internet.

Sub C II 39. The information processing and viewing device according to claim 36 wherein said network provides said information processing and viewing device access to an additional data set that encodes information relating to topographic characteristics.

40. The information processing and viewing device according to claim 36 wherein said network provides said information processing and viewing device storage of said user generated data set that encodes information relating to topographic characteristics.

41. The information processing and viewing device according to claim 36 wherein said network provides said information processing and viewing device access to an archived data set that encodes information relating to topographic characteristics, said archived data set being modifiable by said information processing and viewing device following access; and

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~~said network further providing said information processing and viewing device storage of said modified archived data set.~~

42. The information processing and viewing device according to claim 25 wherein said geographic region includes a golf course and said information includes visual signifiers relating to at least one attribute of said golf course.

43. The information processing and viewing device according to claim 42 wherein said information includes at least one position related aspect of said golf course attribute.

44. The information processing and viewing device according to claim 43 wherein said position related aspect includes information relating to a degree of accuracy of a determination of said position related aspect.

45. The information processing and viewing device according to claim 44 wherein said degree of determination accuracy of said position related aspect is indicated by a visual signifier.

46. The information processing and viewing device according to claim 43 wherein said position related aspect is modifiable by said information processing and viewing device.

47. The information processing and viewing device according to claim 44 wherein said position related aspect is modified by the user to increase the degree of positional accuracy of said position related aspect.

~~48. The information processing and viewing device according to claim 46 wherein said information including modified position related aspects is storable in the information processing and viewing device.~~

49. The information processing and viewing device according to claim 46 wherein said information including modified position related aspects is communicable with a data link cooperative device over a network.

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50. The information processing and viewing device according to claim 25 wherein said information including modified position related aspects is storable in the information processing and viewing device.

51. The information processing and viewing device according to claim 25 wherein said cooperative device is a data link for exchanging said information with a web site.

52. The information processing and viewing device according to claim 25 wherein said geographic region includes a golf course and further included in said information is at least one aspect which relates to the playing of said golf course.

53. The information processing and viewing device according to claim 52 wherein a plurality of said playing aspects comprise an information set relating to a playing of a complete round of said golf course by a golfer.

54. The information processing and viewing device according to claim 53 wherein a plurality of said information sets relate to multiple playings of a complete round of said golf course by a golfer.

55. The information processing and viewing device according to claim 54 wherein said plurality of information sets is statistically analyzed.

56. The information processing and viewing device according to claim 55 wherein a result of said statistical analysis is included in said visual signifiers representing said golf course on said viewer.

57. The information processing and viewing device according to claim 52 wherein a plurality of said playing aspects comprise an information set relating to a playing of a complete round of said golf course by an individual golfer, and a plurality of said information sets each relate, respectively, to an individual playing of a complete round of said golf course by one of a plurality of golfers.

58. The information processing and viewing device according to claim 57 wherein said plurality of information sets is statistically analyzed.

59. The information processing and viewing device according to claim 58 wherein a result of said statistical analysis is included in said visual signifiers representing said golf course on said viewer.

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60. A portable information processing and viewing device for storing and communicating topographic information comprising:

a portable information processing and viewing device, said device having an information processor for the storage, retrieval and processing of data which encodes information, said device also having a viewer for the display of information encoded in the data, said device further having data inputs, said data inputs including at least one of a user interface and direct electrical connections;

said information, encoded in the data, includes information relating to at least one topographic characteristic of at least one selected geographic region, said topographic characteristic being represented on said viewer by visual signifiers, said visual signifiers including at least a representation of an attribute and an indication of a position of said topographic characteristic;

said direct electrical connections adapted for connection with at least one cooperative device for enabling said information processing and viewing device to perform an operation of at least one of generating, accessing, storing and communicating of said data, wherein said cooperative device further enables said information processing and viewing device to autonomously process and display said information relating to topographic characteristics; and

wherein said geographic region includes a golf course, said golf course represented on said viewer by at least a partial display of a selected hole of said golf course.

61. The information processing and viewing device according to claim 60 wherein a location on said golf course representation may be chosen or indicated when enabled by attaching a position module, and said information processing and viewing device displays the topographic characteristics of said location.

62. The information processing and viewing device according to claim 61 wherein the display of the topographic characteristics of said location includes a representation of an attribute at said location.

63. The information processing and viewing device according to claim 61 wherein the display of the topographic characteristics of said location includes an indication of a position of said location.

64. The information processing and viewing device according to claim 61 wherein the display of the topographic characteristics of said location further includes information relating to the playing of a golf shot from said location.

65. The information processing and viewing device according to claim 60 wherein a compilation of said information relating to the playing of a plurality of golf shots from a plurality of said locations is accessible with said cooperative device.

66. The information processing and viewing device according to claim 65 wherein said cooperative device is a position module providing differentially corrected Global Position System location information.

67. The information processing and viewing device according to claim 65 wherein said cooperative device is a data link to a second information processing device.

68. The information processing and viewing device according to claim 65 wherein said cooperative device is a data link to a network providing access to said compilation.

BB 69. The information processing and viewing device according to claim 65 wherein said compilation is modifiable by an addition of information relating to the playing of at least one golf shot from at least one of said locations, said addition of information being provided by said information processing and viewing device.

70. The information processing and viewing device according to claim 60 wherein information of a playing of the golf course is displayed as a moving representation of said playing of the golf course.

71. The information processing and viewing device according to claim 70 wherein said moving representation of the playing of the golf course is displayable in alterable manners, said alterable manners including the rate of progression of said representation.

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72. A portable information processing and viewing device for storing and communicating topographic information comprising:

a portable information processing and viewing device, said device having an information processor for the storage, retrieval and processing of data which encodes information, said device also having a viewer for the display of information encoded in the data, said device further having data inputs, said data inputs including at least one of a user interface and direct electrical connections;

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said information, encoded in the data, relating to at least one topographic characteristic of at least one selected geographic region, said geographic regions including at least one golf course, said characteristic being represented on said viewer by visual signifiers, said visual signifiers including at least a representation of an attribute and an indication of a position of said topographic characteristic;

said direct electrical connections adapted for connection with at least one cooperative device for enabling said information processing and viewing device to perform an operation of at least one of accessing, storing and communicating of said data, said cooperative device further enabling said information processing and viewing device to autonomously process and display said information relating to topographic characteristics;

wherein said cooperative device is a position module for providing differentially corrected Global Position System location information which is used to create at least a first user interface entered data set that encodes information relating to topographic characteristics of at least a first selected geographic region; and

wherein said position module and said stored first user interface entered data set is transferable to a second information processing and viewing device for enabling said second information processing and viewing device to access said first user interface entered data set.

73. A portable information processing and viewing device for storing and communicating topographic information comprising:

a portable information processing and viewing device, said device having an information processor for the storage, retrieval and processing of data which encodes information, said device also having a viewer for the display of information encoded in the data, said device further having data inputs, said data inputs including at least one of a user interface and direct electrical connections;

said information, encoded in the data, relating to at least one topographic characteristic of at least one selected geographic region, said geographic regions including at least one golf course, said characteristic being represented on said viewer by visual signifiers, said visual signifiers including at least a representation of an attribute and an indication of a position of said topographic characteristic;

said direct electrical connections adapted for connection with at least one cooperative device for enabling said information processing and viewing device to perform an operation of at least one of accessing, storing and communicating of said data, said cooperative device further enabling said information processing and viewing device to autonomously process and display said information relating to topographic characteristics;

wherein at least one of said cooperative devices is a position module for receiving position related information.

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74. The information processing and viewing device according to claim 73 wherein said position module receives Global Positioning Satellite information.

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75. The information processing and viewing device according to claim 73 wherein said position module receives differential correction information for correcting Global Positioning Satellite information.

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76. The information processing and viewing device according to claim 73 wherein said position module receives Global Positioning Satellite information and differential correction information for correcting Global Positioning Satellite information.

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77. The information processing and viewing device according to claim 73 wherein said position module receives Global Positioning Satellite information relating to locations on said golf course and differential correction information for correcting said Global Positioning Satellite information, and a second cooperative device is a data link for providing communication of the Global Positioning Satellite derived location information to a second information processing device.

79. The information processing and viewing device according to claim 73 wherein said position module receives Global Positioning Satellite information relating to locations on said golf course and differential correction information for correcting said Global Positioning

Satellite information, and a second cooperative device is a data link for providing communication of the Global Positioning Satellite derived location information over a network.

80. The information processing and viewing device according to claim 73 wherein said one cooperative device is a position module that receives Global Positioning Satellite information relating to locations on said golf course and differential correction information for correcting said Global Positioning Satellite information;

wherein said information relating to locations includes information relating to a relative height of said location and a means to display the same to the user.

81. The information processing and viewing device according to claim 73 wherein said one cooperative device is an position module that receives Global Positioning Satellite information relating to locations on said golf course and differential correction information for correcting said Global Positioning Satellite information; and

a second cooperative device is a means for accessing a stored set of information relating to locations on said golf course, wherein said device utilizes said Global Positioning Satellite and said differential correction information to increase a degree of accuracy of said stored set of information.

82. The information processing and viewing device according to claim 81 wherein said increase in the degree of accuracy of said stored set of information includes an increase in the degree of accuracy of a relative height of said location.

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The information processing and viewing device according to claim ~~73~~ wherein said antenna is detachable for flexible placement.

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The information processing and viewing device according to claim ~~83~~ wherein said antenna is flexibly placeable for improved reception.

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The information processing and viewing device according to claim ~~73~~ wherein said antenna is flexibly placeable for greater accuracy of position determination by closer placement of said antenna to a location for which position is to be determined.

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~~86.~~ The information processing and viewing device according to claim 73 wherein said device is fully operable with said antenna in a reception only mode to decrease power consumption.

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87. A method of storing and communicating sets of topographic information to and from information processing and viewing devices by means of an accessible electronic network, each of the sets being specific to an individual golf course, comprising the steps of:

- (a) inputting a first set of information to a first information processing and viewing device, said first set of information being data representative of a golf course topography, said first set of information including data elements relating to attributes of the golf course, said data elements including at least one characterizing aspect and at least one location for each feature in the set;
- (b) inputting a second set of said information data relating to the playing of a golf ball wherein said information data elements include location data for each golf ball lie;
- (c) transmitting said first and second sets of information from the first information processing and viewing device to the network; and
- (d) providing a second information processing and viewing device access to said first and second sets of information.

88. The method of claim 4 wherein said location data elements include Global Positioning System data.

89. The method of claim 4 wherein said location data elements include differentially corrected Global Positioning System data.

90. A method of storing and communicating sets of topographic information to and from information processing and viewing devices by means of an accessible electronic network, each of the sets being specific to an individual golf course, comprising the steps of:

(a) inputting a first set of information to a first information processing and viewing device, said first set of information being data representative of a golf course topography, said first set of information including data elements relating to attributes of the golf course, said data elements including at least one characterizing aspect and at least one location for each feature in the set;

(b) inputting a second set of information data set of information data relating to at least one ball location as a result of playing the golf course by at least one individual;

(c) transmitting said first and second sets of information from the first information processing and viewing device to the network; and

(d) providing a second information processing and viewing device access to said first and second sets of information.

91. The method of claim 1 wherein said location data elements include Global Positioning System data.

92. The method of claim 1 wherein said location data elements include differentially corrected Global Positioning System data.

11 ~~93.~~ The method of claim 1 wherein said golf course topography includes processing and displaying difference-of-elevation information between any two points on the golf course as selected on the processing and viewing device.

12 ~~94.~~ The method of claim ~~93~~ wherein said difference-of-elevation is interpolated from Global Positioning System data and a georeferenced elevation dataset.

23 95. The method of claim 5 wherein said location data elements include Global Positioning System data.

96. The method of claim 5 wherein said location data elements include differentially corrected Global Positioning System data.

97. A system of storing and communicating sets of topographic information to and from information processing and viewing devices by means of an accessible network, each of the sets being specific to an individual golf course, comprising:

(a) a first information processing and viewing device receiving input of a first set of information, said first set of information being data representative of a golf course topography, said first set of information including data elements relating to attributes of the golf course, said data elements including at least one characterizing aspect and a location for each attribute in the set;

(b) a second set of said information data relating to the playing of a golf ball wherein said information data elements include location data for each golf ball lie.

(c) a central information processing site and database receiving said first and second sets of information from said first information processing and viewing device and providing access to said set over the network; and

(d) a second information processing and viewing device receiving transmission of said first and second sets of information from the first information processing device over the network.

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98. The system of claim 97 including adding location data elements including Global Positioning System data.

99. The system of claim 97 including adding location data elements including differentially corrected Global Positioning System data.

100. A system of storing and communicating sets of topographic information to and from information processing and viewing devices by means of an accessible network, each of the sets being specific to an individual golf course, comprising:

(a) a first information processing and viewing device receiving input of a first set of information, said first set of information being data representative of a golf course topography, said first set of information including data elements relating to attributes of the golf course, said data elements including at least one characterizing aspect and a location for each attribute in the set;

(b) a second set of said information data relating to at least one ball location as a result of playing the golf course by at least one individual;

(c) a central information processing site and database receiving said first and second sets of information from said first information processing and viewing device and providing access to said set over the network; and

(d) a second information processing and viewing device receiving transmission of said first and second sets of information from the first information processing device over the network.

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101. The system of claim 100 including adding location data elements including Global Positioning System data.

102. The system of claim 100 including adding location data elements including differentially corrected Global Positioning System data.

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~~103.~~ The system of claim 13 wherein said golf course topography includes processing and displaying difference-of-elevation information between any two points on the golf course as selected on the processing and viewing device.

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~~104.~~ The system of claim ~~103~~ wherein said difference-of-elevation is interpolated from Global Positioning System data and a georeferenced elevation dataset.

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C19 } 105. The system of claim 100 wherein said data relating to at least one ball location is Global Positioning System data.

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106. The system of claim 100 wherein said data relating to at least one ball location is differentially corrected Global Positioning System data.

107. The information processing and viewing device according to claim 73 wherein said position module comprises an antenna.

108. The information processing and viewing device according to claim 80 wherein the relative height of said location displayed to the user changes dynamically with respect to a target location selected as the information processing and viewing device receives input from the user.

109. The information processing and viewing device according to claim 108 wherein the user input is transmitted by a stylus dragged across a displayed map.